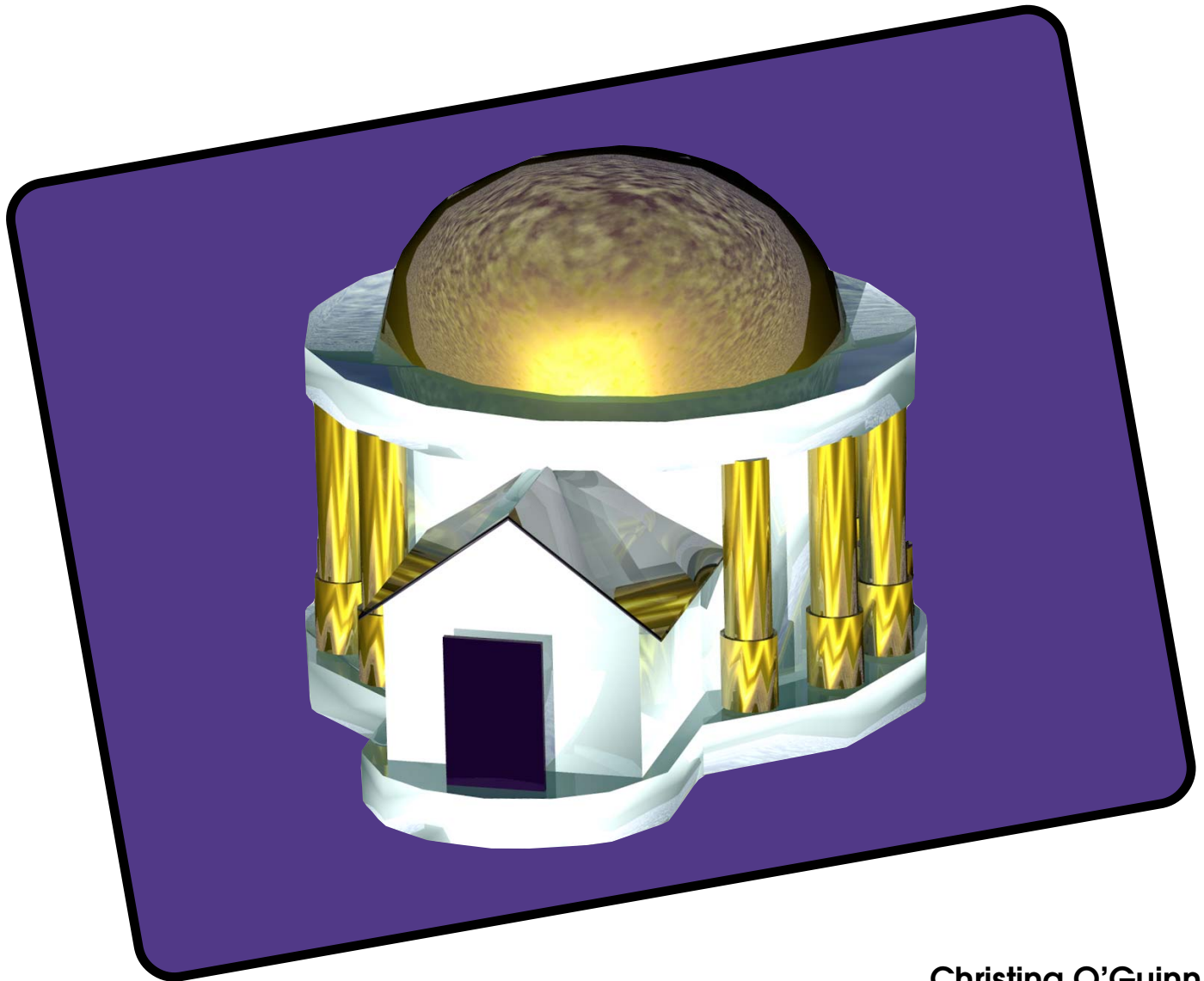


# Occupation Lessons



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## Table of Contents

Introduction	3
Educational Objectives and Concepts	5
Educational Standards	6
Occupation Lessons	
Lesson 1: Occupations Pre-Module Lesson	7
Lesson 2: NASA Occupations Research	11
Lesson 3: Post-Module Reflections on Occupations	14
Lesson 4: Setting Goals and Planning Your Education	17
Occupation Student Sheets	22
Appendix A: Educational Standards List	23
Appendix B: Occupations Glossary	26
Appendix C: Science and Career Resources	32

# CAREERS



## Introduction

The Astro-Venture Occupation Lessons have been developed by the National Aeronautics and Space Administration (NASA) for the purpose of increasing students' awareness of and interest in the many career opportunities that utilize science, math and technology skills. The lessons are designed for educators and guidance counselors to use with students in grades 5-8 who are beginning to make decisions about whether or not to study science, math and computers, and who may be more likely to do so if they are interested in a particular occupation that requires these skills.

This packet is divided into seven sections:

### 1. Educational Objectives and Concepts

This section gives an overview of the educational objectives and the major concepts for each lesson.

### 2. Educational Standards

This section identifies the National Science Education Standards (NSES) and International Society for Technology in Education (ISTE) Standards addressed by each lesson.

### 3. Occupation Lessons

These four lessons were designed to be used in conjunction with the multimedia and chat activities on the Astro-Venture Web site. The first two lessons are intended to be used before students engage in a multimedia module or in a chat. In these lessons, students identify their interests, values and skills and explore occupations that match these. The last two lessons are intended to be used after a multimedia module or chat. In these lessons, students reflect on the occupations they role-played in the modules or were exposed to in the chats, identify an occupation of interest to them and set goals for obtaining such an occupation.

### 4. Occupation Student Sheets

All of the student worksheets, overhead transparencies and a generic evaluation rubric needed for the lessons are included in a separate PDF document which you can access by going to

<[http://astroventure.arc.nasa.gov/is/occupation\\_lessons.html](http://astroventure.arc.nasa.gov/is/occupation_lessons.html)>

The NASA Occupation Fact Sheets are also included in a separate PDF at

<[http://astroventure.arc.nasa.gov/is/fact\\_sheets.html](http://astroventure.arc.nasa.gov/is/fact_sheets.html)> The lessons with which each blackline corresponds is identified on each page.

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A  
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E  
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R  
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**5. Appendix A: Educational Standards List**

The educational standards are detailed here so that they may be referenced from the standards chart provided in section two.

**6. Appendix B: Occupations Glossary**

This glossary contains the words and definitions of the bolded words in the NASA Occupation Fact Sheets.

**7. Appendix C: Science and Career Resources**

The Science and Career Resources is a separate PDF file that includes an extensive list of additional Web sites, videos, books, professional organizations, curriculum materials, science centers, posters, lithographs, speakers, camps and clubs that students and teachers can use to learn more about a particular occupation or science discipline that interests them. Each discipline includes sections on Career Resources and Professional Organizations related to that discipline. In addition, there is a Careers section that lists general career resources. These resources are organized by science discipline and include a brief description and contact information.

Because we are continually updating this resource, we are including it as a separate PDF file that you can access simply by clicking the Science and Career Resources link or by visiting the Career Guidance Center on the Astro-Venture Web site.

## Educational Objectives and Concepts

# CAREERS

Lesson	Objectives	Major Concepts
1. Occupations Pre-Module Lesson	<ul style="list-style-type: none"> <li>Students will list their skills, interests and careers that interest them, the reasons they would pursue these careers and how they might obtain such a career.</li> <li>Students will begin a trading card of themselves listing their skills and interests.</li> </ul>	Matching your skills, interests and values to an occupation
2. NASA Occupations Research	<ul style="list-style-type: none"> <li>Students will identify and describe a NASA occupation that they would be interested in pursuing and will identify the skills, interests and requirements necessary to pursue such an occupation.</li> <li>Students will complete a trading card of themselves in a NASA occupation of their choice.</li> </ul>	Matching your skills, interests and values to an occupation
3. Post- Module and Chat Reflections on Occupations	<ul style="list-style-type: none"> <li>Students will reflect on their feelings about the role they played and explain why they liked or disliked it.</li> <li>Students will reflect on the occupations they have role-played and will give their opinions and explanations of the occupations that most interest them and why.</li> <li>Students will identify the skills, interests and requirements necessary to pursue an occupation of their choice.</li> </ul>	Matching your skills, interests and values to an occupation
4. Setting Goals and Planning Your Education	<ul style="list-style-type: none"> <li>Students will determine the educational and training requirements for an occupation that interests them.</li> <li>Students will set long-term and short-term goals for how they can obtain this education.</li> </ul>	<p>Training and education requirements for occupations</p> <p>Planning to gain necessary requirements for the occupation you desire</p>

## Educational Standards

Lessons	Science Standards							Technology Standards					
	A	B	C	D	E	F	G	1	2	3	4	5	6
1. Occupations Pre-Module Lesson						X			X	X		X	X
2. NASA Occupations Research					X	X	X		X			X	X
3. Post-Module and Chat Reflections on Occupations					X	X	X		X	X	X	X	X
4. Setting Goals and Planning Your Education						X	X		X			X	X

(See Appendix A for a complete list of educational standards)





# CAREERS

## Lesson 1: Occupations Pre-Module Lesson

### Objectives

- Students will list their skills, interests and careers that interest them, the reasons they would pursue these careers and how they might obtain such a career.
- Students will begin a trading card of themselves listing their skills and interests.

### Major Concept

When choosing an occupation, it's important to find one that matches your skills, interests and values.

### Supplies

- Student photos (optional)
- Class set of Trading Card Templates
- Class set of Self-Evaluation Worksheets
- Class set of the Generic Rubric
- Several copies of the employment classified ads section of a newspaper

### Equipment

- Overhead projector, blackboard or chart paper

### Optional Equipment

- Scanner or digital camera
- Drawing software such as Kid Pix, Microsoft Works, etc.
- Computers with Internet browser and connection

### Facilities

Classroom

### Preparation

Run class sets of Trading Card Templates, Self-Evaluation Worksheet and Generic Rubrics

### Schedule

1 - 2 45-minute class periods

## Engage

- Discuss the following vocabulary:
  - **occupation:** The activity that a person does as their regular work. A job.
  - **career:** The order of events that occur in a person's work, over time.
- Ask students how they might go about choosing an occupation. What would make them like one occupation better than another? What would be important for them in an occupation?

## Explore

- Have students list their interests and skills on the Self-Evaluation Worksheet. Discuss with students the difference between liking an activity and being good at it. How do they know if they are good at something? (It might be easy for them. They achieve good grades in it.) Ask them if there is something they really like but that they have to work hard at in order to do well. This would be an example of something that they like but aren't that good at.
- Have students list occupations that they would want to have and why they would want to have them. (If students have access to the Internet, they may want to explore the Web for ideas of possible occupations.)
- *Optional:* Have students visit one of the following Web sites and take the quiz to see what type of work the quiz predicts would be a good match for them:
  - My Future <<http://www.myfuture.com/career/interest.html>>
  - The Career Key <<http://www.ncsu.edu/careerkey>>
  - CollegeView.com <<http://www.collegeview.com/careers>>

## Explain

- Have students share an occupation they think they would like to have and why. Ask students if the occupations they chose match their skills, interests and values.
- Explain that it is important that people try to choose occupations that match their skills, interests and values. Sometimes people pursue jobs because other people tell them that it is what they should do, but individuals should make their own decisions.



- Ask students what they listed as some of their values. If students don't bring up the following values, introduce them to these ideas.
  - Types of work activities:
    - Physical labor, office job, management
    - Working with people or working mostly alone
    - Writing, using computer, researching, organizing, leading, building, traveling
    - Designing vs. developing (coming up with the ideas or creating from someone else's ideas or both)
    - Security
    - Salary amount
    - Recognition
    - Making a worthwhile contribution
    - Number of hours required a week and when the hours are (day, evening or night)
    - Amount of responsibility/control/input
    - Opportunities for advancement
- Explain that it is important to consider all of these factors when choosing a job, so that students can find a job that they will be successful doing and will make them happy. For some people, making money is the most important thing. However, others don't mind making a little less if they can make a valuable contribution to society or if they can be recognized for their work.

## Extend/Apply

- Go over the Generic Rubric with students. Explain to them that this is how you will assess their occupations projects.
- Have students begin their own personal trading card using the Trading Card Template. They should include only their name, interests and skills and a picture of themselves.
- Tell students that they will be role-playing different NASA occupations and will be meeting many NASA specialists throughout their Astro-Venture. They will be able to collect the trading cards of these specialists and characters. They will like some of these occupations better than others. Ask them to think about which occupations most interest them and why. Ask them also to compare their own interests and skills with each specialist they meet to see if there are any similarities.



## Evaluate

- For any completed project, you may want to use the *Generic Rubric* for assessment.
- Assess whether students choose occupations that match their skills and interests. Compare these choices with the choices students make after they complete their *Astro-Venture* and later occupation activities.
- Have students create a classified ad for their ideal job. Bring in copies of the employment classified ads from the local newspaper. Have students read a few and discuss the format and characteristics of a classified ad. Then have them write their own classified ad (max. 30 words) for a job they would like to have. Have students compare the ad with the results of their *Self-Evaluation Worksheet*. Underline those parts of the ad that match with the interests or skills checked in the survey.
- Assess student classified ads for format, grammar, spelling, completeness and how often they matched with the survey results.

# CAREERS



## Lesson 2: NASA Occupations Research

### Objectives

- Students will identify and describe a NASA occupation that they would be interested in pursuing and will identify the skills, interests and requirements necessary to pursue such an occupation.
- Students will complete a trading card of themselves in a NASA occupation of their choice.

### Major Concepts

When choosing an occupation, it's important to find one that matches your skills, interests and values.

### Supplies

- Student photos (optional)
- Class set of Researching NASA Occupations
- Trading Card Templates from Lesson 1
- Self-Evaluation Worksheets from Lesson 1
- Class set of the Generic Rubric

### Equipment

- Overhead projector, blackboard or chart paper
- Computers with Internet browser and connection

### Optional Equipment

- Scanner or digital camera
- Drawing software such as Kid Pix, Microsoft Works, etc.

### Facilities

- Classroom
- Computer lab (optional)

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# CAREERS

## Preparation

- Preview Occupations Web sites listed to make sure they work and are appropriate for your students.
- If Occupations Lesson 1 wasn't completed, run a class set of Self-Evaluation Worksheets and complete this first. Also, run a class set of Trading Card Templates and discuss occupations and careers.

## Schedule

3 - 4 45-minute class periods

## Engage

- Ask students what NASA stands for (National Aeronautics and Space Administration), what kinds of occupations NASA might offer and what kinds of things people in these occupations might do.
- NASA employees conduct research in aeronautics and space. NASA occupations include: astrophysicists, engineers, computer scientists, technicians, life scientists, astronauts, psychologists, architects, mathematicians, chemists, geologists and managers. (See NASA Occupation Fact Sheets and other NASA occupation Web sites for more information on these occupations.)
- Ask students if they think they might like to work at NASA.

## Explore

- Have students research NASA occupations on Web sites that are listed on the Researching NASA Occupations sheet. Have them list at least five occupations that interest them, the skills, interests and requirements for these positions and why each occupation interests them.

## Explain

- Have students share a NASA occupation they have an interest in and why. Ask students if the occupations they chose match their skills, interests and values.
- Explain that it is important for people to choose occupations that match their skills, interests and values. Sometimes people pursue jobs because other people tell them that it is what they should do, but individuals should make their own decisions.



# CAREERS

## Extend/Apply

- Have students write a description of the NASA occupation they like the best, the skills, interests and requirements for this occupation, why they chose it and how they might go about pursuing such a career.
- Have students complete their Trading Card Template of themselves in their chosen occupation by adding information on "What I Do," "Education" and "Experience."
- *Optional:* After collecting several Astro-Venture Trading Cards or several NASA Occupation Fact Sheets featuring NASA Specialists, have students play a guessing game where they give three or more facts about a person of their choice and see if other students can guess who they are describing.

## Evaluate

- For any completed project, you may want to use the Generic Rubric for assessment.
- Assess whether students choose occupations that match their skills and interests. Compare these choices with the choices they made before using Astro-Venture. Are they making choices that match their interests and skills?
- Have students write a letter to a relative explaining which NASA occupation they plan to pursue. The letter should include the skills and requirements of the occupation and why those appeal to them. Students should include the results of their "Self-Evaluation Worksheet" also. Letters should be graded on format, grammar and spelling, and content. Extra credit can be given if they send the letter and get a response.
- An alternative assignment could be to pair students and have them simulate a job interview, which could be presented to the class after some practice. Students would have to be coached about what happens during a job interview. The interviewer would have a position available that the applicant wants. During the interview the interviewer would find out how much the applicant knows about the skills and requirements of the job, and if they have those skills. Grade the interviews on accuracy, poise, correct content and presentation.





## Lesson 3: Post-Module and Chat Reflection on Occupations

### Objectives

- Students will reflect on their feelings about the role they played and explain why they liked or disliked it.
- Students will reflect on the occupations they have role-played and will give their opinions and explanations of the occupations that most interest them and why.
- Students will identify the skills, interests and requirements necessary to pursue an occupation of their choice.

### Major Concepts

When choosing an occupation, it's important to find one that matches your skills, interests and values.

### Supplies

- Class set of Occupations Reflection Sheet
- Self-Evaluation Worksheets from Lesson 1
- Class set of the Generic Rubric
- Large white paper for posters

### Equipment

- Overhead projector, blackboard or chart paper
- Computers with Internet browser and connection (for use with Astro-Venture activities)

### Facilities

- Classroom
- Computer lab (optional)

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# CAREERS

## Preparation

- Run class set of Occupations Reflection Sheets.
- If Occupations Lesson 1 wasn't completed, run a class set of Self-Evaluation Worksheets and complete these first. Also, discuss occupations and careers.
- Familiarize yourself with the types of occupations in the Astro-Venture modules and chats.

## Schedule

- 1 45-minute class period for occupation reflection activity  
(This follows one to ten class periods using the online Astro-Venture activities.)

## Engage

- (Since this lesson is intended for use following a multimedia activity or chat on the Astro-Venture Web site, you may want to use the lessons that go with the specific activity to introduce concepts, vocabulary, etc.)
- *If students will be participating in a multimedia activity,*
  - ask them what it means to role-play a character.
    - **role-play:** To take on the role of another person. To pretend to be that person.
  - ask students how they might decide which character's occupation they would want to role-play.
  - ask students how they would know if they liked role-playing a certain occupation.
- *If students will be participating in a chat,*
  - ask them what kinds of things they would want to ask a NASA specialist that would help them decide if they would like to have that occupation or not.

## Explore

- Have students engage in one or more Astro-Venture multimedia activities and/or chats in which they role-play different occupations or chat with representatives of occupations. Tell them that since they will be asked to evaluate each occupation they role-play or chat with, they should think about what they like and dislike about each.
- After each Astro-Venture activity, have students use the Occupations Reflection Sheet to give their opinions of the role they played and reasons that support those opinions.
- After all Astro-Venture activities are complete, ask students to select their favorite occupations and give reasons why they are their favorites.



# CAREERS

## Explain

- Have students share a NASA occupation they have an interest in and why. Ask students how the occupations they chose match their skills, interests and values.
- Explain that it is important that people try to choose occupations that match their skills, interests and values. Sometimes people pursue jobs because other people tell them that it is what they should do, but individuals should make their own decisions.

## Extend/Apply

- Have students look at the types of answers they recorded under what they liked and disliked on the Occupations Reflection Sheet and record any patterns they notice.
- Have students write a description of the NASA occupation they like the best, the skills, interests and requirements for this occupation, why they chose it and how they might go about pursuing such a career.

## Evaluate

- For any completed project, you may want to use the Generic Rubric for assessment.
- Assess whether students choose occupations that match their skills and interests. Compare these choices with the choices they made before using Astro-Venture. Are they making choices that match their interests and skills?
- Have students create a poster on the NASA occupation they chose to write about. The poster should include career title, salary range, skills, educational and experience requirements, and two interesting facts. The poster should be neat, creative, accurate and include visuals.
- An alternative activity is for students to write "A Day in the Life of a(n) \_\_\_\_ (occupation) \_\_\_\_." Based on what they have learned, students will pretend they are writing an article for a career magazine. They will describe what someone in this occupation would do in a typical day. Include details (if known) such as work hours, daily tasks, type of clothing, getting to work, who they would interact with, etc. The article should be interesting, grammatically correct, factually accurate, and it should paint a picture of the life of someone in that occupation.



## Lesson 4: Setting Goals and Planning Your Education

# CAREERS

### Objectives

- Students will determine the educational and training requirements for an occupation that interests them.
- Students will set long-term and short-term goals for how they can obtain this education.

### Major Concepts

- All occupations have certain training and education requirements.
- By planning, you can make sure that you have the requirements needed for the occupation you wish to have.

### Supplies

- An overhead and class set of Comparison of Educational Institutions Table
- Class set of NASA Occupation Educational Requirements Chart
- Class set of Planning for an Occupation Sheet
- White paper, crayons and markers for brochures
- Class set of the Generic Rubric
- Researching NASA Occupations sheets from Lesson 2 (optional)
- NASA Occupation Fact Sheets (optional)

### Equipment

- Overhead projector, blackboard or chart paper
- Computers with Internet browser and connection (to research occupations if desired)

### Facilities

- Classroom
- Computer lab (optional)

## Preparation

- Run class sets of Comparison of Educational Institutions Table , NASA Occupation Educational Requirements Chart and Planning for an Occupation Sheet.
- Make an overhead transparency of the Comparison of Educational Institutions Table.
- Print out NASA Occupation Fact Sheets (optional).
- Talk to school counselors to find out what kind of career-related internships, school-to-work and after-school programs and clubs exist in your community for students to consider in pursuing their goals. Also, gather college catalogs from these counselors and find out what the high school graduation requirements are for your district.

## Schedule

2 to 3 45-minute class period for occupation reflection activity

## Engage

- Ask students to share what some of the NASA occupations were that they were most interested in (from Lessons 2 and 3).
- Ask students to raise their hands if the occupation they chose requires some college education.
- Ask students what they think the requirements are to get into college.
- Discuss the differences between types of institutions and degrees. Start by asking students what they know about each institution and degree.
  - **vocational school:** A school that trains people in specific skills for certain occupations.
  - **community college/junior college:** Schools that offer a two-year degree or certificate that is generally equal to the first two years of a four-year college.
  - **college:** A school where bachelor's degrees can be earned following high school.
  - **university:** A school where bachelor's degrees, master's degrees and doctorate degrees can be earned.
  - **associate's degree.** A degree usually earned from a community college, junior college or vocational school after completion of two years of full-time study. This degree is generally equal to the first two years of study towards a bachelor's degree.

- **bachelor's degree:** A university or college degree earned after completion of at least four years of full-time study. B.S. stands for a bachelor of science. B.A. stands for a bachelor of arts.
- **master's degree:** A university or college degree earned after completion of one to two years of study beyond a bachelor's degree. M.S. stands for a master of science. M.A. stands for a master of arts.
- **doctorate:** The highest degree awarded by a college or university earned after completion of at least five years of study beyond a bachelor's degree. A Ph.D. is a doctorate of philosophy.

## Explore

- Have students select an occupation that they would like to have and that matches their skills, interests and values. They can choose an occupation from Lesson 2 or 3 or they may want to explore the Internet for another occupation that interests them. Students should print out or take notes on the information for the occupation they choose. If they choose a NASA occupation, they should print out the NASA Occupation Fact Sheet on that occupation.
- Have students determine the educational and training requirements for their chosen occupation by using the NASA Occupation Educational Requirements Chart or by researching their chosen occupation on the Web at a site such as: the Occupational Outlook Handbook <<http://stats.bls.gov/ocohome.htm>>
- Have students create a brochure promoting the occupation of their choice. Have them include pictures of someone in this profession doing tasks related to the job, a description of the job, highlights of the position and training and education requirements. They should make the brochure with the objective of trying to persuade other people that this is a job they might want to pursue.
- Have students use the Comparison of Educational Institutions Table to research the requirements for each type of institution. Talk to your school counselors to get specific information on district high school graduation requirements. Students will likely have the most success in searching specific institutions using college catalogs or the Internet to find an example of each type of school and to list their requirements for admission, tuition cost and type of degree offered. Suggest to students that they go to <<http://www.yahoo.com>> and select "US States" under "Regions." They can then select the state of their choice and then "Education." This will return links for universities, colleges and vocational schools for that state.



The following are some links for institutions in California which can be used as an example:

- San Jose State University  
<<http://www.sjsu.edu>>
- San Jose State University High School Requirements  
<<http://soar.sjsu.edu/web-dbgen/soar/admission/n213.html>>
- San Jose State University Freshman Admission Requirements  
<<http://soar.sjsu.edu/web-dbgen/soar/admission/n8.html>>
- DeAnza Community College:  
<<http://www.deanza.fhda.edu/>>
- DeAnza Community College Who May Attend?  
<<http://www.deanza.fhda.edu/admissions/info.shtml>>
- RWM Vocational School Database  
<<http://www.rwm.org/rwm/>>
- United Education Institute Admissions (vocational school)  
<[http://www.uei.org/frame\\_admissions.html](http://www.uei.org/frame_admissions.html)>

### Explain

- Have students share their brochures of the occupations they chose and the educational requirements for those positions.
- Have students also share their research on the requirements, cost and degrees of different types of institutions. Using an overhead of the Comparison of Educational Institutions Table, create a class chart that compiles all of the data students found. Determine what requirements and degrees came up the most and tended to be required at most schools. Average the tuition figures found and/or list a tuition range.
- Explain that it is important to begin considering the requirements for admission to a college or university prior to high school, because the classes they take in high school may determine whether they can go to a college or university or not.
- Discuss with students the different possibilities for obtaining the education required for the occupations they chose. Point out that it is not necessary to begin by going to a four-year college or university, but is possible to begin at a junior college or community college for two years and then attend a college or university for two years. Discuss the advantages and disadvantages of each possibility by addressing issues such as cost, more strict admission requirements, quality of education and choice of courses offered.



- Tell students that the occupation they have chosen is their long-term goal. This is a goal that will take more than five years to reach. However, it is important to come up with short-term goals of steps that will help them achieve the long-term goal so that they can stay on the right track. These short-term goals can include the classes they take in high school, how well they do in these classes, the types of summer jobs and extracurricular activities they participate in, local school-to-work or internship programs, the type of institution they choose to attend after high school and the courses they choose to study at these institutions. Talk to school counselors to find out what kind of relevant programs exist in your community for students to consider in pursuing their goals.

### Extend/Apply

- Have students use their research and the Planning for an Occupation sheet to make a plan of how they can obtain the occupation they chose. This plan will include the long-term goal of the occupation they chose and short-term goals of what they can do in high school and after high school to gain the education, training and experience necessary.
- Have students show this plan to their parents for their comments and signature.

### Evaluate

- For any completed project, you may want to use the Generic Rubric for assessment.
- Assess whether students' plans are reasonable for obtaining the occupation they chose.
- Assess whether students' brochures accurately represent the educational and training requirements of the occupation they have chosen. Also, assess brochures for neatness, completeness, accuracy of information, creativity and use of space and visuals.
- Have students create their own resume as a resume for someone who would qualify for the job they want. The teacher should review the parts of a resume with the class (Most word processing programs have resume templates.) Students will fill in as much of the information as possible with current and correct information. Then fill in the education (with college name, major, dates, etc.) and experiences (internships, volunteer work, etc.) they think would help them to obtain the job they want. Again, the resume should be graded on neatness, accuracy, spelling and grammar.



## Occupation Student Sheets

All of the student worksheets, overhead transparencies and a generic evaluation rubric needed for the lessons are included in a separate PDF document which you can access by going to:

[http://astroventure.arc.nasa.gov/is/occupation\\_lessons.html](http://astroventure.arc.nasa.gov/is/occupation_lessons.html)

The NASA Occupation Fact Sheets are also included in a separate PDF at:

[http://astroventure.arc.nasa.gov/is/fact\\_sheets.html](http://astroventure.arc.nasa.gov/is/fact_sheets.html)

The lessons with which each blackline corresponds is identified on each page.

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## Appendix A: Educational Standards List

### *National Science and Education Standards (NSES)*

#### **Content Standard A: Science as Inquiry**

- A1. Abilities necessary to do scientific inquiry (K-8)
- A2. Understanding about scientific inquiry (K-8)

#### **Content Standard B: Physical Science**

- B1. Properties of objects and materials (K-4)
- B2. Position and motion of objects (K-4)
- B3. Light, heat, electricity and magnetism (K-4)
- B4. Properties and changes of properties in matter (5-8)
- B5. Motions and forces (5-8)
- B6. Transfer of energy (5-8)

#### **Content Standard C: Life Science**

- C1. The characteristic of organisms (K-4)
- C2. Life cycle of organisms (K-4)
- C3. Organisms and environments (K-4)
- C4. Structure and function in living systems (5-8)
- C5. Reproduction and heredity (5-8)
- C6. Regulation and behavior (5-8)
- C7. Populations and ecosystems (5-8)
- C8. Diversity and adaptations of organisms (5-8)

#### **Content Standard D: Earth and Space Science**

- D1. Properties of earth materials (K-4)
- D2. Objects in the sky (K-4)
- D3. Changes in earth and sky (K-4)
- D4. Structure of the earth system (5-8)
- D5. Earth's history (5-8)
- D6. Earth in the solar system (5-8)



# CAREERS

## **Content Standard E: Science and Technology**

- E1. Abilities of technological design (K-8)
- E2. Understandings about science and technology (K-8)
- E3. Abilities to distinguish between natural objects and objects made by humans (K-4)

## **Content Standard F: Science in Personal and Social Perspectives**

- F1. Personal Health (K-8)
- F2. Characteristics and changes in population (K-4)
- F3. Types of resources (K-4)
- F4. Changes in environments (K-4)
- F5. Science and technology in local challenges (K-4)
- F6. Populations, resources and environments (5-8)
- F7. Natural hazards (5-8)
- F8. Risks and benefits (5-8)
- F9. Science and technology in society (5-8)

## **Content Standard G: History and Nature of Science**

- G1. Science as a human endeavor (K-8)
- G2. Nature of science (5-8)
- G3. History of science (5-8)

## ***International Society for Technology in Education (ISTE) Standards***

### **TECHNOLOGY FOUNDATION STANDARDS FOR STUDENTS**

#### **1. Basic operations and concepts**

- Students demonstrate a sound understanding of the nature and operation of technology system
- Students are proficient in the use of technology

#### **2. Social, ethical, and human issues**

- Students understand the ethical, cultural and societal issues related to technology.
- Students practice responsible use of technology systems, information and software.
- Students develop positive attitudes toward technology uses that support

lifelong learning, collaboration, personal pursuits and productivity.

### 3. Technology productivity tools

- Students use technology tools to enhance learning, increase productivity and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and product other creative works.

### 4. Technology communications tools

- Students use telecommunications to collaborate, publish, and interact with peers, experts and other audiences.
- Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

### 5. Technology research tools

- Students use technology to locate, evaluate and collect information from a variety of sources.
- Students use technology tools to process data and report results
- Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

### 6. Technology problem-solving and decision making tools

- Students use technology resources for solving problems and making informed decisions.
- Students employ technology in the development of strategies for solving

problems in the real world.

## Appendix B: Occupations Glossary

<b>aerodynamics</b>	The way that air moves around objects.
<b>aerospace</b>	Having to do with the Earth's atmosphere and space beyond Earth.
<b>algebra</b>	A type of math that uses letters as symbols to represent unknown numbers.
<b>associate's degree</b>	A degree usually earned from a community college, junior college or vocational school after completion of two years of full-time study. This degree generally is equal to the first two years of study toward a bachelor's degree.
<b>asteroid</b>	A rocky, metallic object that orbits a star.
<b>astronomy</b>	The study of space beyond Earth.
<b>astrophysics</b>	The science of the stars, objects related to stars and the forces that determine how they interact.
<b>B.A.</b>	(bachelor of art) A university or college degree earned after completion of at least four years of study.
<b>B.S.</b>	(bachelor of science) A university or college degree earned after completion of at least four years of study.
<b>bachelor's degree</b>	A university or college degree earned after completion of at least four years of full-time study following high school. A B.S. stands for a bachelor of science. A B.A. stands for a bachelor of arts.
<b>bacteria</b>	A form of life that has only one cell and can only be seen with a microscope.
<b>biochemistry</b>	The study of matter that makes up living things, what the matter is made of, how it's structured and its features.





<b>biology</b>	The study of life.
<b>biotechnology</b>	The use of living things to create new products such as medicines or new techniques such as waste recycling.
<b>botany</b>	The study of plants.
<b>calculus</b>	A type of math that uses special kinds of symbols.
<b>ceramic</b>	Hard, breakable, heat-resistant material made by heating clay at a very high temperature.
<b>chemical</b>	Having to do with the study of matter, what it's made of, how it's structured and its features.
<b>chemistry</b>	The study of matter, what it's made of, how it's structured and its features.
<b>college</b>	A school where bachelor's degrees can be earned following high school.
<b>comet</b>	A ball of ice and rock that orbits a star.
<b>community college/junior college</b>	A school that offers a two-year degree or certificate that is generally equal to the first two years of a four-year college.
<b>computer electronics</b>	The study of computer devices and systems and how they work.
<b>database</b>	A collection of data that is organized in a way so that it is quick and easy to find.
<b>DNA</b>	(Deoxyribo Nucleic Acid) A long, complex molecule that contains the codes that control your cells' activities, the chemicals that make up your body and heredity.
<b>doctorate</b>	The highest degree awarded by a university earned after completion of at least five years of study beyond a bachelor's degree. A Ph.D. is a doctorate of philosophy.
<b>electrical engineering</b>	The scientific technology of electricity for use in designing and developing equipment that produces power and controls machines.

<b>electronics</b>	The study of devices and systems that are powered by using electricity.
<b>engineer</b>	To design, construct or build; also, a person who designs, constructs or builds.
<b>engineering</b>	The use of math and science to design and build structures, equipment and systems.
<b>fieldwork</b>	Observations and work done in an actual work environment to gain real-life experience and knowledge.
<b>fluid dynamics</b>	The study of liquids and how they move.
<b>fluid mechanics</b>	The study of the effect of forces on liquids.
<b>galaxy</b>	A large group of stars that are held together by gravity.
<b>genetics</b>	The study of genes and how they transmit features from parents to their children.
<b>geology</b>	The study of Earth.
<b>geometry</b>	A type of math that involves the measurement and features of shapes, points, lines, angles, surfaces and solids.
<b>graphics</b>	Information that is represented with images or pictures.
<b>hardware</b>	Computers and the equipment used with computers such as monitors, printers and disk drives.
<b>human factors engineering</b>	The use of psychology and other areas of science to develop systems that people use in a way that makes the system easy, safe and useful.
<b>junior college</b>	A school that offers a two-year degree or certificate that is generally equal to the first two years of a four-year college.
<b>laboratory</b>	A building used for scientific research.

<b>M.A.</b>	(master of art) A university degree earned after completion of at least one year of study beyond a bachelor's degree.
<b>M.S.</b>	(master of science) A university degree earned after completion of at least one year of study beyond a bachelor's degree.
<b>master's degree</b>	A university degree earned after completion of one to two years of study beyond a bachelor degree. An M.S. is a master's degree earned in science. An M.A. is a master's degree earned in liberal arts.
<b>mechanical engineering</b>	The use of math and science to design and build structures, equipment and systems that produce heat or power.
<b>meteoroid</b>	Small rocky objects that orbit a star.
<b>meteorology</b>	The study of the conditions in the atmosphere, especially weather.
<b>microbe</b>	A living thing that is so small, it can only be seen with a microscope. Bacteria and viruses are microbes.
<b>microbiology</b>	The study of microbes.
<b>microscope</b>	An instrument that uses lenses to make small objects appear large.
<b>moon</b>	A natural object that orbits a larger object, usually a planet.
<b>navigate</b>	To control the path or route of a ship, aircraft or spacecraft.
<b>nervous system</b>	A system in animals that controls the body functions and senses. In humans it includes the brain, spinal cord and nerves.
<b>network</b>	A number of computers connected together so that information can be sent between them.
<b>observation</b>	The act of watching carefully.

<b>observatory</b>	A building designed for making observations usually of stars or other objects in space.
<b>paleontology</b>	The study of fossils.
<b>Ph.D.</b>	(doctorate of philosophy) The highest degree awarded by a university, earned after completion of at least nine years of college study following high school. This includes four years to earn a bachelor's degree and five to seven years to earn a Ph.D.
<b>photosynthesis</b>	The process plants use to turn sunlight into energy.
<b>physical science</b>	Any of the sciences, such as chemistry, physics, astronomy and geology, that investigate the features of energy and nonliving matter.
<b>physics</b>	The study of matter and energy and how they work together.
<b>physiology</b>	An area of biology that studies the major functions of plants and animals such as growth, reproduction, photosynthesis, respiration and movement.
<b>planet</b>	A large body that orbits a star and does not give off its own light.
<b>planetarium</b>	A device that projects images of stars, planets and other objects in space and their movement onto the surface of a round dome.
<b>planetary sciences</b>	The study of a planet or planets, what they are made of, how they are structured and their orbits.
<b>pre-calculus</b>	A math class taken to introduce calculus.
<b>probe</b>	A device sent into space to explore and research orbiting objects.
<b>propulsion dynamics</b>	The study of the forces that move, drive or propel an object forward.
<b>psychology</b>	The study of how the brain processes information and how humans behave.
<b>reproduction</b>	The act of producing children.

<b>respiration</b>	The act or process of breathing.
<b>sensor</b>	A device that detects and responds to a signal.
<b>software</b>	Computer programs that control how a computer functions.
<b>solar system</b>	Our Sun and the objects that travel around it.
<b>space science</b>	Any of several sciences, such as astrobiology, that study occurrences and objects in space other than Earth.
<b>star</b>	A large, hot ball of gases, which gives off its own light.
<b>statistics</b>	A type of math that involves collecting, organizing and interpreting numbers.
<b>systems engineering</b>	The use of math and science to design and build groups of connected parts that work together as a whole.
<b>technical institute</b>	A school that trains people in specific skills for certain occupations that use technology.
<b>telescope</b>	An instrument that collects light and makes distant objects appear larger and closer.
<b>thermal</b>	Having to do with heat.
<b>thermodynamics</b>	The study of how heat moves.
<b>trigonometry</b>	A type of math that studies and compares angles in a right triangle.
<b>universe</b>	All existing things, including Earth, the solar system and the galaxies.
<b>university</b>	A school where bachelor's degrees, master's degrees and doctorate degrees can be earned following high schools.
<b>vocational school</b>	A school that trains people in specific skills for certain occupations.
<b>virus</b>	A particle so small it can only be seen with a microscope and that can reproduce inside a living cell.
<b>zoology</b>	The study of animals.





## Appendix C: Science and Career Resources

The Science and Career Resources is an extensive list of additional Web sites, videos, books, professional organizations, curriculum materials, science centers, posters, lithographs, speakers, camps and clubs that students and teachers can use to learn more about a particular occupation or science discipline that interests them. Each discipline includes a section on Career Resources and Professional Organizations related to that discipline. In addition, there is a Careers section that lists general career resources. These resources are organized by science discipline and include a brief description and contact information.

Because we are continually updating this resource, we are including it as a separate PDF file that you can access simply by clicking the Science and Career Resources link or by visiting the Career Guidance Center on the Astro-Venture Web site.

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